

R15

Code No: 123BR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, November/December - 2016

BASIC ELECTRICAL ENGINEERING

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

1. a) State the Superposition theorem. [2]
- b) Distinguish between potential difference and electromotive force. [3]
- c) Define Periodic function and Cycle. [2]
- d) What is the significance of form factor and peak factor? [3]
- e) What is the purpose of using core in a transformer? [2]
- f) Define the regulation of transformer. [3]
- g) List the basic requirements to produce e.m.f. [2]
- h) What are the various losses in a D.C. Motor? [3]
- i) What are the various classifications of instruments? [2]
- j) What are the various types of Ammeters and voltmeters? [3]

PART-B

(50 Marks)

2. a) Explain the Kirchhoff's laws.
- b) By using star-delta transformation for the following figure 1. Find the current 'I' supplied by the battery? [5+5]

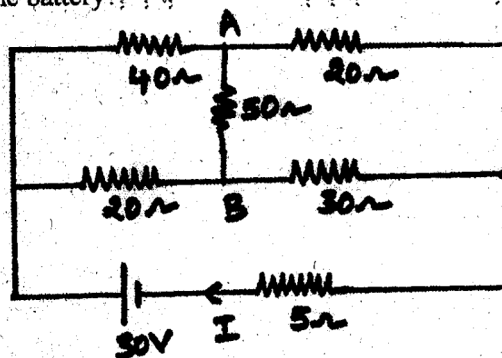


Figure: 1
OR

3. Using method of superposition, determine the current through the 5kΩ resistors for the circuit in figure 2. [10]

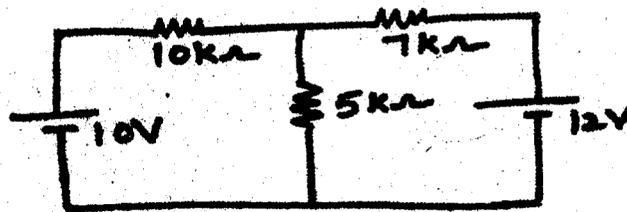


Figure: 2

4. a) Explain the concept of Average value and RMS value.
b) An alternating current varying sinusoidally, with a frequency of 50Hz, has an rms value of 20A. Write down the equation for the instantaneous value and find this value at (i) 0.0025s, (ii) 0.0125s after passing through a positive maximum value. At what time, measured from a positive maximum value, will instantaneous current be 14.14A? [5+5]

OR

5. a) In an a.c. circuit, $v = 200 \sin(\omega t + 30^\circ)$ V, $i = 15 \sin(\omega t - 30^\circ)$ A. Find reactive power.
b) In a series RC circuit, the values of $R = 100 \Omega$ and $C = 25 \mu\text{F}$. A sinusoidal voltage of 50 MHz is applied and the maximum voltage across the capacitance is 2.5V. Find the maximum voltage across the series combination and also determine the apparent power. [5+5]

6. a) Explain the transformer on no-load with phasor diagram.
b) A 50Hz single phase transformer has 6600V/400V. Having e.m.f per turn is 10V and the maximum flux density in the core is 1.6 Tesla. Find the:
i) Suitable number of primary and secondary turns
ii) Cross sectional area of the core. [5+5]

OR

7. A 25 kVA, 2200/220V, 50Hz single phase transformer obtained the following test results.
OC test (L.V. side) = 220V, 1.2A, 100 w
SC test (H.V. side) = 100V, 7 A, 310w
Calculate the parameters of the equivalent circuit of transformer referred to L.V. side and draw the equivalent circuit. [10]

8. Explain the constructional details of a D.C. Generator with neat sketches. [10]

OR

9. a) Derive the torque equation of induction motor.
b) A three-phase induction motor runs at 1440 rpm at full load when supplied power from 50 Hz, 3-phase line. Calculate i) slip at full load ii) frequency of rotor voltage iii) speed of rotor at a slip of 10%. [5+5]

10. Describe the moving coil permanent magnet instrument with neat circuit diagram. [10]

OR

11. Explain the essential requirements of indicating instruments with necessary diagrams. [10]

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